770-101

A

06/30/97

Attorney's Docket No. 1647/47358 ***PATENT***

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s):

GORDON, Scott B.

WARNING: *Patent must be applied for in the name(s) of all of the actual inventor(s). 37 CFR 1.41(a) and 1.53(b).*

For (title):

AUDIBLE COMMUNICATION WITH A MODEM OVER A WIDE AREA NETWORK

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date June 30, 1997, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number TB447317816, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Brian Colomey

(type or print name of person mailing paper)

Brian Colomey

Signature of person mailing paper

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.10(b).

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 CFR 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

1. Type of Application

This new application is for a(n)

(check one applicable item below)

☒ Original (nonprovisional)

☐ Design

☐ Plant

WARNING: ***Do not*** *use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.*

WARNING: ***Do not*** *use this transmittal for the filing of a provisional application.*

NOTE: If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.

☐ Divisional.

☐ Continuation.

☐ Continuation-in-part (C-I-P).

2. Benefit of Prior U.S. Application(s) (35 U.S.C. 119(e), 120, or 121)

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

WARNING: *If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20–year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c–i–p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.*

WARNING: *When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application* ***must*** *be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).*

☐ The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed That Are Required for Filing Date under 37 C.F.R. 1.53(b) (Regular) or 37 C.F.R. 1.153 (Design) Application

10 Pages of specification

1 Pages of claims

1 Pages of Abstract

2 Sheets of drawing

☐ formal

☒ informal

WARNING: ***DO NOT*** *submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. Comments on proposed new 37 CFR 1.84. Notice of March 9, 1988 (1990 O.G. 57-62).*

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page." 37 C.F.R. 1.84(c)).

(complete the following, if applicable)

☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. 1.84(b).

4. Additional papers enclosed

☐ Preliminary Amendment

☐ Information Disclosure Statement (37 C.F.R. 1.98)

☐ Form PTO–1449 (PTO/SB/08A and 08B)

☐ Citations

☐ Declaration of Biological Deposit

☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative

☐ Special Comments

☐ Other

5. Declaration or oath

☒ Enclosed

Executed by

(check **all** *applicable boxes)*

☒ inventor(s).

☐ legal representative of inventor(s). 37 CFR 1.42 or 1.43.

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. *See* item 13 below for fee.

☐ Not Enclosed.

WARNING: *Where the filing is a completion in the U.S. of an International Application, but where a declaration is not available, or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.*

☐ Application is made by a person authorized under 37 C.F.R. 1.41(c) on behalf of *all* the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).

NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).

☐ Showing that the filing is authorized.
(not required unless called into question. 37 CFR 1.41(d))

6. Inventorship Statement

WARNING: *If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.*

The inventorship for all the claims in this application are:

☐ The same.

or

☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted.

☐ will be submitted.

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of $130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).

NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).

☒ English

☐ Non-English

☐ The attached translation is a verified translation. 37 C.F.R. 1.52(d).

8. Assignment

☒ An assignment of the invention to EMC Corporation
171 South Street, Hopkinton, MA 01758

☒ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☐ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters-one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: *A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.*

9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. no.	Filed
Country	Appln. no.	Filed
Country	Appln. no.	Filed

from which priority is claimed

☐ is (are) attached.

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 C.F.R. 1.16)

A. ☐ Regular application

CLAIMS AS FILED				
Number filed	Number Extra		Rate	Basic Fee 37 C.F.R. 1.16(a) $770.00
Total Claims (37 CFR 1.16(c)) 4 – 20 =		×	$ 22.00	770.00
Independent Claims (37 CFR 1.16(b)) – 3 =		×	$ 80.00	
Multiple dependent claim(s), if any (37 CFR 1.16(d))		+	$260.00	

☐ Amendment cancelling extra claims is enclosed.

☐ Amendment deleting multiple-dependencies is enclosed.

☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation $ 770.00

B. ☐ Design application
($320.00—37 CFR 1.16(f))

Filing Fee Calculation $_____

C. ☐ Plant application
($530.00—37 CFR 1.16(g))

Filing fee calculation $_____

11. Small Entity Statement(s)

☐ Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

WARNING: *"Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121 or 365(c) of a prior application may rely on a verified statement filed in the prior application if the nonprovisional application includes a reference to a verified statement in the prior application or includes a copy of the verified statement filed in the prior application if status as a small entity is still proper and desired." 37 C.F.R. § 1.28(a).*

(complete the following, if applicable)

☐ Status as a small entity was claimed in prior application

_____ / _____, filed on _____, from which benefit is being claimed for this application under:

35 U.S.C. ☐ 119(e),
☐ 120,
☐ 121,
☐ 365(c),

and which status as a small entity is still proper and desired.

☐ A copy of the verified statement in the prior application is included.

Filing Fee Calculation (50% of **A, B** or **C** above)

$_____

NOTE: Any excess of the full fee paid will be refunded if a verified statement and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 CFR 1.28(a).

12. Request for International-Type Search (37 C.F.R. 1.104(d))

(complete, if applicable)

☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

☐ Not Enclosed

☐ No filing fee is to be paid at this time.
(This and the surcharge required by 37 C.F.R. 1.16(e) can be paid subsequently.)

☒ Enclosed

☒ Basic filing fee	$ 770.00
☒ Recording assignment ($40.00; 37 C.F.R. 1.21(h)) (See attached "COVER SHEET FOR ASSIGNMENT ACCOMPANYING NEW APPLICATION".)	$ 40.00
☐ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached ($130.00; 37 C.F.R. 1.47 and 1.17(h))	$
☐ For processing an application with a specification in a non-English language ($130.00; 37 C.F.R. 1.52(d) and 1.17(k))	$
☐ Processing and retention fee ($130.00; 37 C.F.R. 1.53(d) and 1.21(l))	$
☐ Fee for international-type search report ($40.00; 37 C.F.R. 1.21(e))	$

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 CFR 1.53(d) and this, as well as the changes to 37 CFR 1.53 and 1.78, indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(d).

Total fees enclosed $ 810.00

14. Method of Payment of Fees

☒ Check in the amount of $ 810.00

☐ Charge Account No. _____ in the amount of $_____.

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: *If no fees are to be paid on filing, the following items should not be completed.*

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.*

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 04-1105 :

☒ 37 C.F.R. 1.16(a), (f) or (g) (filing fees)

☒ 37 C.F.R. 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☒ 37 C.F.R. 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☒ 37 C.F.R. 1.17 (application processing fees)

WARNING: *While 37 CFR 1.17(a), (b), (c) and (d) deal with extensions of time under § 1.136(a), this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 C.F.R. 1.136(a) is to no avail unless a request or petition for extension is filed." (Emphasis added). Notice of November 5, 1985 (1060 O.G. 27).*

☐ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

NOTE: 37 CFR 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee." From the wording of 37 CFR 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions as to Overpayment

☐ Credit Account No. _____

☐ Refund

Brian Michaelis

SIGNATURE OF ATTORNEY

Reg. No. 34,221

Brian L. Michaelis

(type or print name of attorney)

Tel. No. (617) 523-3400

DIKE, BRONSTEIN, ROBERTS & CUSHMAN, LLP

P.O. Address

130 Water Street, Boston, MA 02109

☒ **Incorporation by reference of added pages**

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added _____

☐ Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added _____

☒ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added 1

☐ **Statement Where No Further Pages Added**

(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)

☐ This transmittal ends with this page.

AUDIBLE COMMUNICATION WITH A MODEM OVER A WIDE AREA NETWORK

FIELD OF THE INVENTION

The present invention relates to modems in a modem pool, and more particularly to a method and apparatus implementing communication with a modem over a wide area network.

BACKGROUND OF THE INVENTION

Modems are well known and have been in use for some time to transmit digital information over distributed wide area networks. Typical modems transform a two level, i.e. digital, computer signal into a form suitable for transmission over the public switched telephone network. Rather than sending binary information from the computer, circuitry in a sending modem (i.e. MOdulation circuitry) converts the binary information into signals, e.g. pulse tones, suitable for transmission over the telephone network. A typical modem also includes circuitry (i.e. DEModulation circuitry) for receiving transmissions sent to it over the telephone network and converting them back to digital data suitable to pass to a destination computer. Modems known in the art typically do not have any capability to transmit voice information over the telephone network. That is, modems can not be used to talk over the telephone network, and typically a separate connection initiated telephonically is required to inquire in a real-time, audible manner as to the status of a transmission sent via modem.

Remote "modem pools", comprised of a plurality of modems, are used in wide area systems communications, for communication between remote and local electronic systems, wherein the remote modem(s) and local computer system(s) are typically interconnected over a wide area network (WAN) such as Ethernet. The remote modem pool is typically located a significant distance from the local computer, and the remote modem is used by the local computer to

dial up one or more remote computers in a locality that is a local telephone call from the remote modem(s). In this manner, long distance telephone charges are avoided between the local computer and the remote computer(s), as the WAN and remote modem pool are used to transmit information over the long distance between the local system and the remote modem(s).

The modem pool comprises a plurality of modems and an access server that supports the plurality of modems used for dialing into or out of computer facilities local to the remote modem(s). The access server in effect provides routing and translation capabilities between the WAN and one or more of the plurality of modems in the modem pool. Accordingly, a local computer connected to the WAN can access modems in the modem pool via the access server.

In a typical modem pool configuration, a local computer (such as at a service facility) may be available to receive communications, such as status or error information, from one or more remote systems. For example, the remote computer would issue a status information file or packet out onto the Ethernet directed to the local computer. The status information packet from the remote system is communicated, typically in a local telephone call via a resident modem in the remote system(s), to a remote modem in the modem pool. The remote modem provides the status information packet to the access server which effects translation of the information into packet(s) formed in accordance with the WAN protocol (e.g. Ethernet) for transmission over the WAN, as known in the art. Upon receipt of the information from the remote computer, an operator at the local computer may need to effect return communication with the remote computer, such as by sending out a return file. With the local computer located significant distances from the modem(s) in the modem pool, it is not possible to monitor or listen to the transmission to or from the remote modem pool. The operator typically relies on text messages

received at the local system that indicate the status of the communications. In some cases, the local machine may be returning a communication that will be received at the remote site through an automated attendant that requires specific instructions that must be followed. The local user will not be able to listen to communications from such automated attendants, even though the remotely located modems have facilities (i.e. speakers) for listening to the transmissions. Additionally, the operator at the local machine may wish to have verbal/audio communication with the remote site, for example to speak with an operator at the remote site. Such audio communication is generally carried out over a telephone, at long distance rates or charges applicable for phone communication between the remote and local sites.

Disadvantageously, in known remote modem pools using known access servers, there is no mechanism for listening at a local site, to a transmission over the WAN of communication between the local machine and the remote modem. That is, modems in a modem pool do not have capabilities for transmitting an audible transmission signal back over the WAN to be listened to at the local. Similarly, modems in known remote modem pools do not provide facilities for effecting an audio transmission over the WAN in order to avoid having to incur the additional charges associated with a long distance telephone connection in addition to the modem-to-network communication between the local and remote sites.

SUMMARY OF THE INVENTION

The present invention provides a method and apparatus for effecting low cost audible communication between a local machine at a local site and a remote modem, over a wide area network.

According to the invention, a remote modem, e.g. in a modem pool, is configured to include a converter added to a telephone interconnection of the modem. As the remote modem receives

communication(s) from the local machine, the signal generated by the modem onto a local phone line for communication with the remote computer is split and the converter receives the signal (heading to or from the WAN) from the telephone side of the modem. The converter, comprised of a telephone line interface, provides an audio output that is input to sound processing hardware, e.g. a soundcard, on an interface PC that runs an audio streaming program which packetizes and puts the audio signal back onto the WAN for transmission to the local computer. The local computer, suitably equipped with a soundcard and a similar audio streaming program receives the audio from the remote modem communication and can "play" it as continuous time-based audio. In this manner, one can listen to the exchange of signals between the remote modem and the local computer, over the WAN and at the local computer.

In one embodiment of the invention, the converter is configured so that a connection between the local computer and the remote modem initiated by the local machine can be kept open. In this manner, a telephone connected to the telephone side of the remote modem can be used to provide a telephone audio signal. The telephone audio signal is similarly split at the converter, which receives the telephone audio signal from the telephone side of the modem. The converter provides the telephone audio signal to the soundcard on the interface PC that runs the audio streaming program. The interface PC running the audio streaming program packetizes and puts the telephone audio signal onto the WAN for transmission to the local computer. The local computer, suitably equipped with the soundcard and the similar audio streaming program receives the audio from the telephone at the telephone side of the remote modem and can "play" it as continuous time-based audio. In this manner, one can listen to a telephone communication introduced at the telephone side of the remote modem, over the WAN and at the local computer without incurring long distance phone charges, as the phone call is routed over the

WAN.

Features of the invention include a low cost implementation for effecting audible communication between a local machine at a local site and a remote modem, over a wide area network. Non-complex, low cost components are used in implementing audible communication with the remote modem. Significant cost savings accrue by using a telephone interconnection effecting transmissions over the WAN and avoiding long distance connect charges for telephone communication between the remote and local sites.

BRIEF DESCRIPTION OF THE DRAWING

The foregoing and other features and advantages of the present invention will be more fully understood from the following detailed description of illustrative embodiments, taken in conjunction with the accompanying drawing in which:

Fig. 1 is a block diagram of an embodiment implementing audible communication with a remote modem in a modem pool over a wide area network according to the invention; and

Fig. 2 is a block diagram of an embodiment implementing audible communication with a remote modem, according to the invention, in a networked storage device monitoring system.

DETAILED DESCRIPTION

A method and apparatus implementing audible communication with a remote modem over a wide area network, according to the invention, is illustrated in Fig. 1. The embodiment is implemented generally in the context of a remote modem pool, comprised of a plurality of modems 10. Each of the modems 10 in the pool is used in wide area systems communications, for communication between a local electronic system or computer 12 and a remote electronic or computer system 14 that includes a resident modem 16 to facilitate electronic communication therewith. The

remote modem(s) 10 and the local computer system(s) 12 are interconnected over a wide area network (WAN) 18, such as Ethernet, via appropriate hardware as known in the art.

The remote modem 10 is typically located a significant distance from the local computer 12. The local computer 12 accesses the remote modem 10 via the WAN 18, and the remote modem is used by the local computer to dial up the resident modem 16 associated with the remote computer. The remote modem 10 is located in a locality that is a local telephone call to/from the remote computer 14 and its resident modem 16. In this manner, long distance telephone charges are avoided between the local computer and the remote computer, as the WAN and remote modem pool are used to transmit information over the long distance between the local and the remote systems.

The modem pool providing the context of the present invention generally comprises the plurality of modems 10 and an access server 20. The access server 20, such as a Cisco Systems Inc. 2500 Series Access Server known in the art, supports the plurality of remote modems in effect providing routing and translation capabilities between the WAN 18 and one or more of the plurality of modems 10 in the modem pool. Accordingly, the local computer 12 connected to the WAN 18 accesses modems 10 in the modem pool via the access server 20, which is described in detail in the CiscoPro CPA 2509 and CPA 2511 Access Server User Guide which is hereby incorporated herein by reference.

According to the invention, at least one remote modem in the pool is configured to include a converter 22 added to a telephone interconnection on the modem as known in the art. The converter 22 is a Telephone Line Interface, such as a TCA3388 made by Motorola and described in detail in the Motorola Master Selection Guide (Analog and Interface Integrated Circuits), pertinent portions of which are incorporated herein by reference. The converter 22, among other things, provides impedance matching and

effectively converts the signal taken off the telephone side of the remote modem 10 into an appropriate signal for further processing, as described hereinafter. It should be appreciated that each modem in the modem pool with which audible communication is desired, must have a respective converter 22 configured as described herein to effect audible communication.

As the remote modem 10 receives communication(s) from the local machine 12, via the access server 20, the signal generated by the modem onto a local phone line 24 for communication with the remote computer 14, is split and the converter 22 receives the signal (heading to or from the WAN) from the telephone side of the remote modem 10. The converter 22 converts the telephone network transmission signal and provides an audio output signal that is input to an interface computer or PC 26. The interface PC 26, such as an IBM Personal Computer or compatible, is equipped with a soundcard 28, as known in the art, that receives the audio output signal from the converter 22 (for communications going to the remote computer).

The interface PC 26 receives the audio output signal and prepares it for transmission over the WAN back to the local computer 12. The interface PC 26 runs an audio streaming program 27, such as Real Audio by Progressive Networks, which packetizes and puts the audio signal onto the WAN for transmission to the local computer 12. The local computer 12 suitably equipped with its own soundcard 30 receives from the WAN the packetized audio from the communication to the remote modem 10. The local computer 12 is configured with a similar audio streaming program 34 that de-packetizes the audio communication received over the WAN and can "play" it as continuous time-based audio. In this manner, one can listen to the exchange of signals from the local computer 12 to the remote modem 10, over the WAN and at the local computer 12.

The converter 22 is additionally configured so that the connection between the local computer 12 and the remote modem 10,

initiated by the local machine 12, can be kept open by making a connection to a remote phone instead of a remote modem. That is, a telephone 36, as known in the art, in this embodiment is connected to the converter 22 at the telephone side of the remote modem 10. Such a connection can be made via a splitter as known in the art. The telephone 36 can be used to provide a telephone audio signal generated by someone speaking into the telephone 36. The telephone audio signal is provided to the converter 22, which in turn provides the telephone audio signal to the soundcard 28 on the interface PC 26 that runs the audio streaming program 27 for transmission of the telephone audio signal over the WAN. The interface PC 26 running the audio streaming program 27 packetizes and puts the telephone audio signal onto the WAN for transmission to the local computer 12. The local computer 12, suitably equipped with the soundcard 30 and the similar audio streaming program 34 receives the telephone audio signal from the telephone 36 at the telephone side of the remote modem and can "play" it as continuous time-based audio. In this manner, one can listen to a telephone communication introduced at the telephone side of the remote modem, over the WAN and at the local computer without incurring long distance phone charges (as the phone call is routed over the WAN).

Similarly, the local machine 12, with appropriate audio capabilities, i.e. a microphone, can undertake audio communication with the remote phone 36 over the WAN by dialing the remote phone 36 (instead of the remote modem). Such audio communication between the local computer and the remote phone 36 would be effected as a local call.

Although the system as described herein involves configuring a remote modem in a modem pool to make local calls to remote computer systems with resident modems, it will be appreciated that the remote modem/pool can be configured to communicate with other automated systems that incorporate intelligence to gather status

information and communicate it over a WAN, such as arrays of storage devices including disk drives, security systems and other systems having system performance monitoring capabilities.

For example, in a networked storage device monitoring system as generally illustrated in Fig. 2, a plurality of storage devices include intelligence that is provided in the form of microcomputers or processors analogous to the "remote computer(s)" as described hereinabove. The plurality of storage devices may be constituted by a first plurality of storage devices 40 located in one remote location networked to other pluralities of storage devices 42, 44 located in other remote locations. A central control computer 46 acts as a central remote computer effecting a "clearinghouse" or server for status information that it receives from the various distributed nodes. In such an embodiment, the central controller/remote computer provides a measure of security (as in a "firewall") in that it isolates the various nodes/storage arrays from direct communication with the modem pool 10'. Nonetheless, the system is configured so that it is a "local call" from the remote modem pool 10' to the central controller/remote computer 46. A configuration as described hereinbefore with respect to Fig. 1, provides the ability to listen to communication and effect telephone communication at the telephone side of the remote modem 10', over the WAN and to/from the local computer. Such communication can be effected without incurring long distance phone charges, which provides a substantial cost saving.

Although the embodiment(s) described hereinbefore involve modem "pools" and incorporate an access server in the form of Cisco Systems Inc. 2500 Series Access Server known in the art, it should be appreciated that the configuration described can be implemented in the context of a single remote modem, as opposed to a modem pool comprising a plurality of modems, and further that alternative access servers can be implemented in modem pool contexts, such as access servers or the like available from 3COM,

Bay Networks, Cabletron Systems or others.

While an "off-the-shelf" audio streaming program, i.e. Real Audio by Progressive Networks, is described in the illustrative embodiment of the invention described herein, it will be appreciated that other programs and/or facilities can be implemented to packetize and put audio signals onto the WAN for transmission to the local computer, such as other off-the-shelf continuous time based audio streaming programs, dedicated audio streaming programs or the like.

Although the illustrative embodiment described herein incorporates a converter in the form of a particular Telephone Line Interface device providing impedance matching and converting the signal taken off the telephone side of the remote modem into an appropriate signal for transmission to a soundcard in the interface PC, it should be appreciated that other means can be implemented for conditioning the telephone audio signal for receipt by the PC hardware, such as a modified microphone and line plug in transformer or the like.

Although the invention has been shown and described with respect to exemplary embodiments thereof, various other changes, omissions and additions in the form and detail thereof may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. An apparatus for effecting audible communication between a local system and a remote system over a Wide Area Network (WAN), comprising:

a remote modem configured in said remote system and receiving telephone transmission signals;

a converter electrically interconnected to a telephone interconnection of said remote modem and receiving said telephone transmission signals therefrom and providing an audio output signal;

an interface machine receiving said audio output signal from said converter, said interface machine including a first sound processing mechanism processing said audio output signal for transmission over said WAN as a network audio signal;

a second sound processing mechanism configured at said local system, receiving said network audio signal and processing said network audio signal to provide a continuous audio signal at said local system.

2. The apparatus of claim 1 wherein said remote system includes a remote telephone interconnected to a telephone interconnection of said remote modem.

3. The apparatus of claim 1 wherein said interface machine is a computer and said first sound processing mechanism is a sound card running on said computer and configured to run an audio streaming program.

4. The apparatus of claim 1 wherein said second sound processing mechanism is a sound card running on said local system and configured to run an audio streaming program.

ABSTRACT

A method and apparatus for effecting low cost audible communication between a local machine at a local site and a remote modem, over a wide area network. A remote modem, e.g. in a modem pool is configured to include a converter added to a telephone interconnection of a modem in the modem pool. As the remote modem receives communication(s) from the local machine the signal generated by the modem onto a local phone line for communication with the remote computer, is split and the converter receives the signal (heading to or from a WAN) from the telephone side of the modem. The converter provides an audio output that is input to sound processing hardware on an interface PC that runs an audio streaming program which packetizes and puts the audio signal back onto the WAN for transmission to the local computer. The local computer, suitably equipped with sound processing hardware and a similar audio streaming program receives the audio from the remote modem communication and can "play" it as continuous time-based audio. In this manner, one can listen to the exchange of signals between the remote modem and the local computer, over the WAN and at the local computer.

DIKE, BRONSTEIN, ROBERTS & CUSHMAN, LLP
130 Water Street
Boston, Massachusetts 02109

Attorney's Docket No. 1647/47358

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that: My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed at 201) below or an original, first and joint inventor (if plural names are listed at 201-208 below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

AUDBILE COMMUNICATION WITH A MODEM OVER A WIDE AREA NETWORK

which is described and claimed in:

x the specification attached hereto.

☐ the specification in U.S. Application Serial Number _____, filed on _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign/PCT Applications and Any Priority Claims Under 35 U.S.C. 119:			
Application No.	Filing Date	Country	Priority Claimed Under 35 U.S.C. 119?
			☐YES ☐NO
			☐YES ☐NO

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S) (35 U.S.C. § 119(e))

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below:

Applicant	Provisional Application Number	Filing Date

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) with full powers of association, substitution and revocation to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Sewall P. Bronstein (Reg. No. 16,919) Linda M. Buckley (Reg. No. 31,003) Peter F. Corless (Reg. No. 33,860)
David G. Conlin (Reg. No. 27,026) Ronald I. Eisenstein (Reg. No. 30,628) Brian L. Michaelis (Reg. No. 34,221)
George W. Neuner (Reg. No. 26,964) Henry D. Pahl, Jr. (Reg. No. 20,438) William J. Daley, Jr. (Reg. No. 35,487)
Ernest V. Linek (Reg. No. 29,822) Peter J. Manus (Reg. No. 26,766) David D. Lowry (Reg. No. 38,538)
David S. Resnick (Reg. No. 34,235)

SEND CORRESPONDENCE TO:	**DIRECT TELEPHONE CALLS TO:**
Brian L. Michaelis, Esq. DIKE, BRONSTEIN, ROBERTS & CUSHMAN, LLP 130 Water Street Boston, Massachusetts 02109	Brian L. Michaelis, Esq. (617) 523-3400

FULL NAME OF INVENTOR	LAST NAME GORDON	FIRST NAME SCOTT	MIDDLE NAME B.
RESIDENCE & CITIZENSHIP	CITY UPTON	STATE OR FOREIGN COUNTRY MASSACHUSETTS	COUNTRY OF CITIZENSHIP U.S.A.
POST OFFICE ADDRESS	POST OFFICE ADDRESS 158 PLEASANT ST.	CITY UPTON	STATE OR COUNTRY AND ZIP CODE MASSACHUSETTS 01568

I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signature of Inventor 201

Scott Gordon

Date:

6/27/97

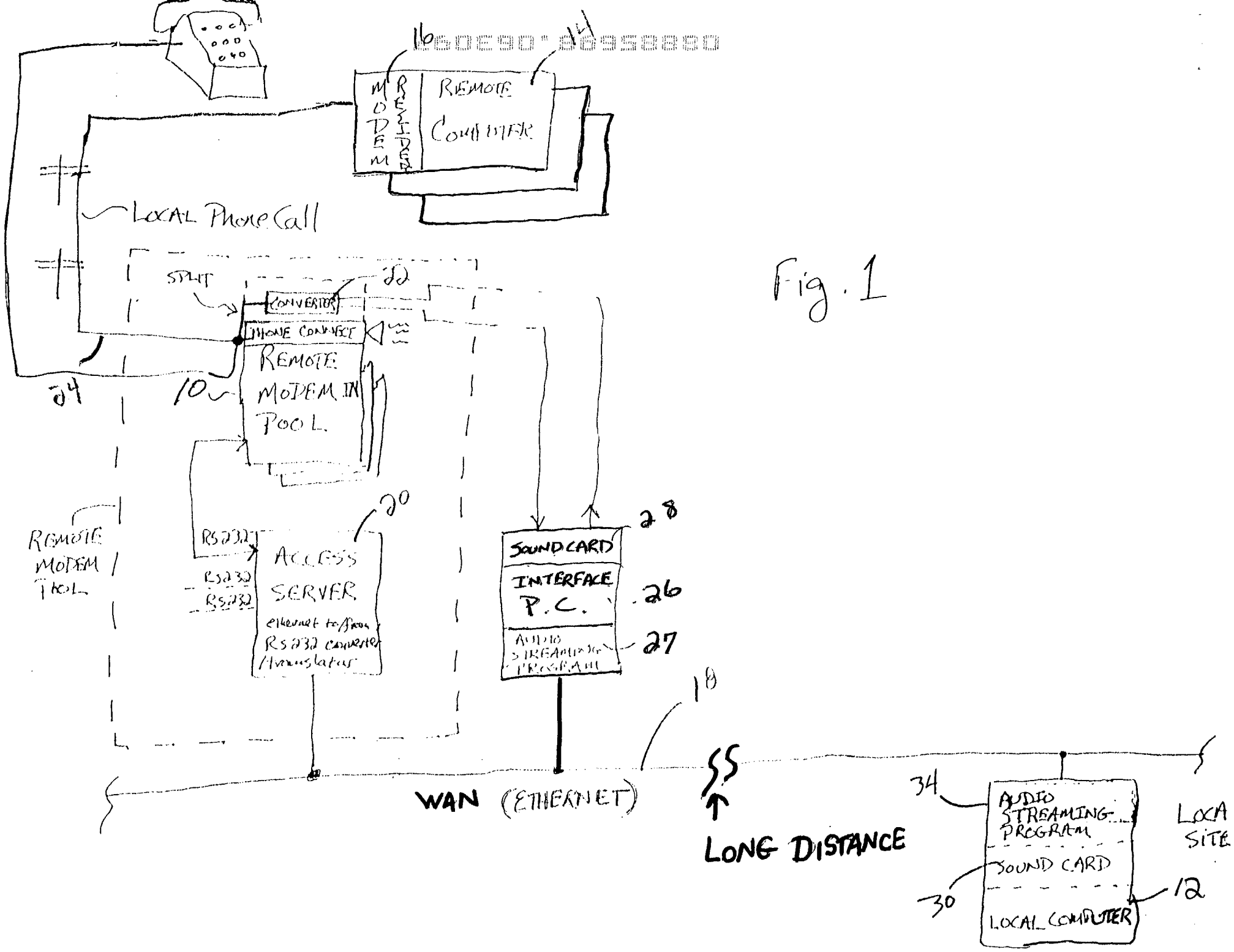
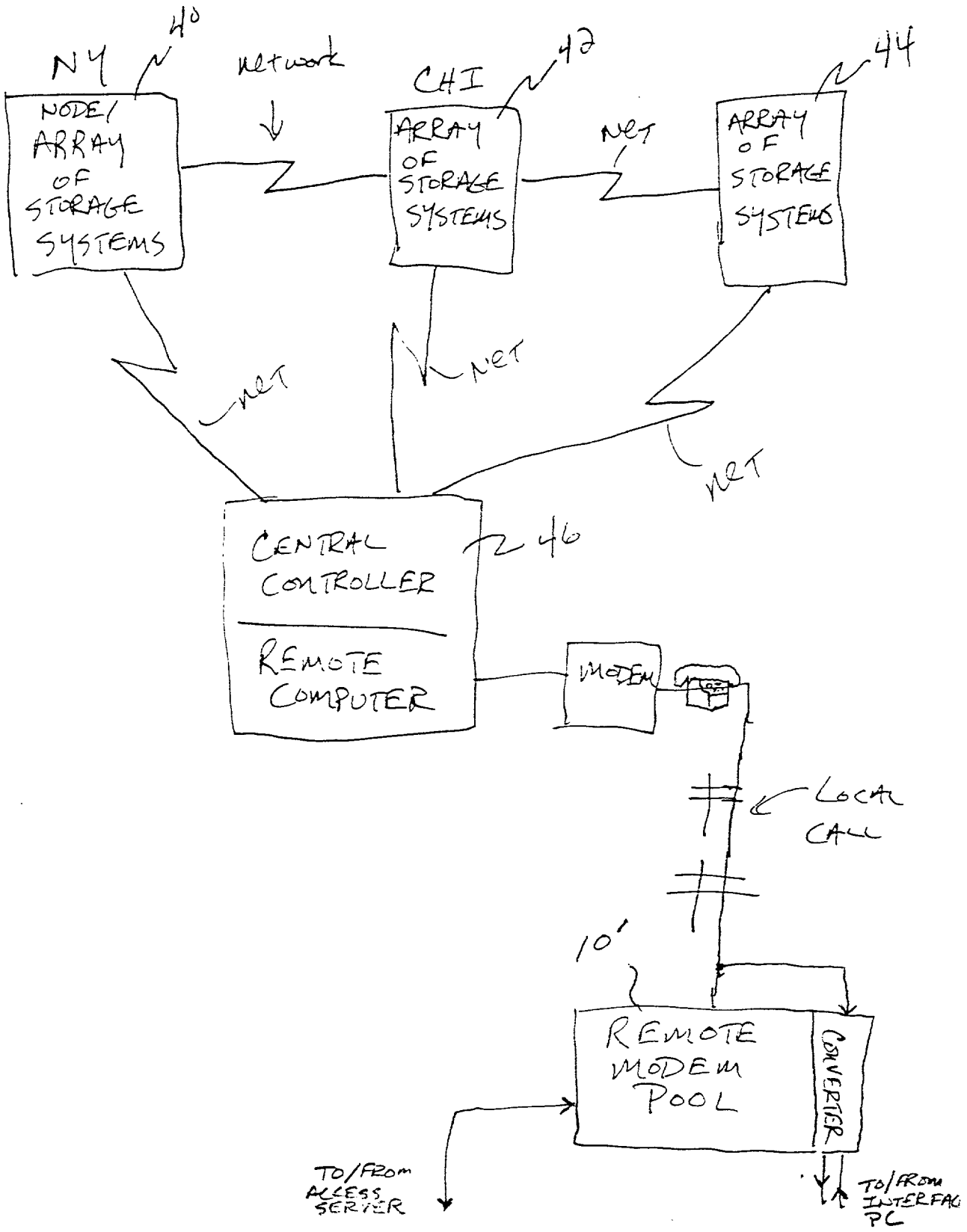

16
MODEM
REMOTE
COMPUTER
LOCAL Phone Call
SPLIT
CONVERTOR
PHONE CONNECT
REMOTE MODEM IN POOL
24
10
22
REMOTE MODEM TOOL
RS232
RS232
RS232
ACCESS SERVER
ethernet to/from RS232 converter/translator
30
SOUND CARD
INTERFACE P.C.
AUDIO STREAMING PROGRAM
28
26
27
18
WAN (ETHERNET)
LONG DISTANCE
34
AUDIO STREAMING PROGRAM
SOUND CARD
LOCAL COMPUTER
30
12
LOCAL SITE

Fig. 1

Fig. 2


NY
40
NODE/ ARRAY OF STORAGE SYSTEMS
network
CHI
42
ARRAY OF STORAGE SYSTEMS
NET
44
ARRAY OF STORAGE SYSTEMS
NET
NET
NET
CENTRAL CONTROLLER
46
REMOTE COMPUTER
MODEM
LOCAL CALL
10'
REMOTE MODEM POOL
CONVERTER
TO/FROM ACCESS SERVER
TO/FROM INTERFACE PC